REMARKS

Claims 21-34 and 36-39 were previously pending in this application. Claims 22-27, 32 and 34 are currently amended. Full support for these amendments may be found in the original specification. No new matter is introduced by these amendments. Claims 21-34 and 36-39 are currently under consideration.

Applicants acknowledge the Examiner's remarks that "claims 21-34 and 36-39 are deemed free from the prior art, given the failure of prior art to teach or reasonably suggest an isolated polynucleotide of SEQ ID NO: 1 encoding a 1-deoxy-D-xylulose 5-phosphate reductoisomerase and plants transformed with said polynucleotide." (Office Action page 5).

The Examiner has withdrawn rejections under 35 U.S.C. §102(a) as being anticipated by Sato *et al.* and under 35 U.S.C. §103(a), in view of applicants' amendments and arguments.

The Examiner has withdrawn rejections under 35 U.S.C. §102(b) as being anticipated by Burkhardt P. *et al.* in view of applicants' amendments.

Applicants respectfully submit that claims 21-34, and 36-39 are in condition for allowance.

I. 35 U.S.C. §112, First Paragraph, Written Description

Claims 21-34 and 36-39 remain rejected under 35 U.S.C. §112, first paragraph, as allegedly containing subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The Office Action contains two reasons for the 35 U.S.C. §112, first paragraph rejections. First, "The definition for 'stringent conditions', does not exclude unrecited hybridization conditions. Limitations recited in the specification are not to be read into the claims. Hybridization and wash conditions are to be recited in the claim itself." (Office Action page 2). Second, "The specification does not provide support for a written description of an isolated polynucleotide sequence having 70%, 80%, or 90% sequence identity to SEQ ID NO: 1 and encoding a 1-deoxy-D-xylulose 5-phosphate reductoisomerase either by recitation of the hybridization and wash conditions of high stringency in the claim or by a description in the

specification of conserved structural features that could be correlated with function of a polynucleotide sequence having 70%, 80%, or 90% sequence identity to SEQ ID NO: 1 and also encode a 1-deoxy-D-xylulose 5-phosphate reductoisomerase."

The Office Action further states that the applicants' arguments filed on 7/15/2003 were considered but not deemed persuasive, and that the rejection is maintained for the reasons of the record set forth in the Office Action of 2/12/2003. Applicants respectfully disagree. However, for the purposes of facilitating the prosecution, the applicants have amended claims 22-24, 26, 27, 32 and 34, without prejudice.

Claims 22-24, 26-27, 32 and 34 have been currently amended to include polynucleotides having at least 95% identity to that of SEQ ID NO: 1 over the entire length of SEQ ID NO: 1. The amended claims find full support in the specification, for example at page 8, line 22: "As used herein, the terms 'stringent conditions' and 'stringent hybridization conditions' mean that hybridization will generally occur if there is at least 95% and preferably 97% identity between the sequences." Hybridization conditions have also been recited in part (d) of the claims. Support for such amendments are found in the specification at page 8, lines 22 through page 9, line 2.

Accordingly, rejections of claims 21-34 and 36-39, for written description defects, should be withdrawn.

II. 35 U.S.C. §112, First Paragraph, Enablement

Claims 21-34 and 36-39 remain rejected under 35 U.S.C.§ 112, as allegedly containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The Office Action states that applicants' arguments filed 7/15/2003 have been considered but were not deemed persuasive.

The Office Action states that applicants do not teach a method of analyzing a plant for altered isoprenoid content or a phenotype of a plant transformed with a 1-deoxy-D-xylulose 5-phosphate reductoisomerase and having an altered isoprenoid content.

Applicants respectfully disagree. The applicants describe methods of altering the flux through the isoprenoid pathway with additional constructs for the expression of additional genes

for isoprenoid biosynthesis (page 16, paragraphs 4 and 5, ending on page 17 of the specification). Applicants recite 1-deoxyxylulose 5-phosphate synthase as one such gene. Furthermore, applicants reference PCT application WO 99/07867 and Shintani *et al.* as describing additional genes to direct the isoprenoid biosynthesis towards specific end products. Descriptions of the analysis of the end products are contained within the cited references. One of skill in the art would recognize that the applicants had provided enabling description with these references when combined with the description of dxr isolation, vector construction and plant transformation provided in the specification.

The Office Action further states that the applicants have not taught how to predictably eliminate sequences that do not embody the invention. The Office Action points to the definition of 'stringent conditions' in the specification and states that recitation of a single example of such conditions does not exclude other hybridization conditions.

Applicants respectfully disagree. For the purposes of facilitating prosecution, applicants have amended claims 22-24, 26, 27, 32 and 34, without prejudice, to provide that polynucleotides have at least 95% identity to that of SEQ ID NO: 1 over the entire length of SEQ ID NO: 1. The amended claims find full support in the specification, for example at page 8, line 22: "As used herein, the terms 'stringent conditions' and 'stringent hybridization conditions' mean that hybridization will generally occur if there is at least 95% and preferably 97% identity between the sequences." Hybridization conditions have also been recited in part (d) of the claims. Support for such amendments are found in the specification at page 8, lines 22 through page 9, line 2.

The Office Action takes the position that the application does not provide guidance for assaying dxr specific activity and therefore has not enabled the isolation of broad category of polynucleotides encoding polypeptides having dxr specific activity. Applicants respectfully disagree. The specification at page 18, 3rd and 4th paragraphs teach the construction of baculovirus shuttle vectors for expressing the nucleotides of the present invention in *E. coli* strains containing a mutation in the native dxr gene, for the express purpose of confirmation of activity by complementation. Example 6 demonstrates that the cloned *A. thaliana* cDNA encodes a functional DXR enzyme because it complements the *E. coli* strain carrying a

disruption in the dxr gene. Therefore, the applicant has indeed provided a method for testing polynucleotides encoding polypeptides having DXR activity.

The Office Action asserts that applicants' arguments regarding the Estevez reference only confirm the uncertainty and unpredictability in using dxr to alter isoprenoid biosynthetic flux (Office Action of 10/22/2003, page 5). Applicants respectfully disagree. Estevez *et al.* merely contradicts the assertion by the Office Action of the non-limiting role for such reductoisomerases in the non-mevalonate isoprenoid biosynthetic pathway in plants. The Office Action further states that the results of Mahmoud *et al.* (reference supplied by applicants in previous response of February 12, 2003) suggest that dxr activity is only limiting in certain tissues during specific times during development. Applicants respectfully disagree. The Mahmoud reference showed a positive correlation between increased DXR activity and increased isoprenoid (monoterpene) biosynthesis in a plant.

The Office Action also states that applicant has not responded to the enablement rejection with respect to the Linthurst *et al.* (The Plant Cell, 1:285-291(1989)) reference. The Linthurst reference was cited in support of the Office Action assertion that the "likelihood of enhancing disease resistance from transformation with a gene involved in disease resistance cannot be predicted (Office action of February 12, 2003, page 6). Claim 20, which claimed a method of modulating disease resistance in a plant, was cancelled in the applicants' previous response dated July 11, 2003. Therefore, the Linthurst reference is moot.

Accordingly, rejections of claims 21-34 and 36-39, should be withdrawn.

In view of the above, each of the above pending claims is believed to be in condition for allowance. Applicants respectfully request that a timely Notice of Allowance be issued in this case.

If the Examiner believes that contacting the undersigned would facilitate concluding the prosecution of this application, he is invited to call at the number indicated below.

Respectfully submitted,

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